



DEPARTMENT OF THE AIR FORCE  
59TH MEDICAL WING (AETC)  
JOINT BASE SAN ANTONIO - LACKLAND TEXAS

6 FEB 2017

MEMORANDUM FOR SGOSV

ATTN: CAPT MATTHEW KOROSCIL

FROM: 59 MDW/SGVU

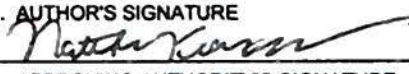

SUBJECT: Professional Presentation Approval

1. Your paper, entitled Acute Pulmonary Embolism Leading To Cavitation and Large Pulmonary Abscess: A Rare Complication of Pulmonary Infarction presented at/published to Journal of Respiratory Medicine Case Reports in accordance with MDWI 41-108, has been approved and assigned local file #17046.
2. Pertinent biographic information (name of author(s), title, etc.) has been entered into our computer file. Please advise us (by phone or mail) that your presentation was given. At that time, we will need the date (month, day and year) along with the location of your presentation. It is important to update this information so that we can provide quality support for you, your department, and the Medical Center commander. This information is used to document the scholarly activities of our professional staff and students, which is an essential component of Wilford Hall Ambulatory Surgical Center (WHASC) internship and residency programs.
3. Please know that if you are a Graduate Health Sciences Education student and your department has told you they cannot fund your publication, the 59th Clinical Research Division may pay for your basic journal publishing charges (to include costs for tables and black and white photos). We cannot pay for reprints. If you are 59 MDW staff member, we can forward your request for funds to the designated wing POC.
4. Congratulations, and thank you for your efforts and time. Your contributions are vital to the medical mission. We look forward to assisting you in your future publication/presentation efforts.

*Linda Steel-Goodwin*

LINDA STEEL-GOODWIN, Col, USAF, BSC  
Director, Clinical Investigations & Research Support

# PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS

1. TO: CLINICAL RESEARCH	2. FROM: (Author's Name, Rank, Grade, Office Symbol) Koroscil, Matthew, Capt, 0-3, <b>SG05V</b>	3. GME/GHSE STUDENT: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	4. PROTOCOL NUMBER:
5. PROTOCOL TITLE: (NOTE: For each new release of medical research or technical information as a publication/presentation, a new 59 MDW Form 3039 must be submitted for review and approval.)			
6. TITLE OF MATERIAL TO BE PUBLISHED OR PRESENTED: Acute pulmonary embolism leading to cavitation and large pulmonary abscess: A rare complication of pulmonary infarction			
7. FUNDING RECEIVED FOR THIS STUDY? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO FUNDING SOURCE:			
8. DO YOU NEED FUNDING SUPPORT FOR PUBLICATION PURPOSES: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
9. IS THIS MATERIAL CLASSIFIED? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
10. IS THIS MATERIAL SUBJECT TO ANY LEGAL RESTRICTIONS FOR PUBLICATION OR PRESENTATION THROUGH A COLLABORATIVE RESEARCH AND DEVELOPMENT AGREEMENT (CRADA), MATERIAL TRANSFER AGREEMENT (MTA), INTELLECTUAL PROPERTY RIGHTS AGREEMENT ETC.? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO NOTE: If the answer is YES then attach a copy of the Agreement to the Publications/Presentations Request Form.			
11. MATERIAL IS FOR: <input checked="" type="checkbox"/> DOMESTIC RELEASE <input type="checkbox"/> FOREIGN RELEASE CHECK APPROPRIATE BOX OR BOXES FOR APPROVAL WITH THIS REQUEST. ATTACH COPY OF MATERIAL TO BE PUBLISHED/PRESENTED.			
<input checked="" type="checkbox"/> 11a. PUBLICATION/JOURNAL (List intended publication/journal.) Respiratory Medicine Case Reports			
<input type="checkbox"/> 11b. PUBLISHED ABSTRACT (List intended journal.)			
<input type="checkbox"/> 11c. POSTER (To be demonstrated at meeting: name of meeting, city, state, and date of meeting.)			
<input type="checkbox"/> 11d. PLATFORM PRESENTATION (At civilian institutions: name of meeting, state, and date of meeting.)			
<input type="checkbox"/> 11e. OTHER (Describe: name of meeting, city, state, and date of meeting.)			
12. HAVE YOUR ATTACHED RESEARCH/TECHNICAL MATERIALS BEEN PREVIOUSLY APPROVED TO BE PUBLISHED/PRESENTED? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO ASSIGNED FILE # _____ DATE _____			
13. EXPECTED DATE WHEN YOU WILL NEED THE CRD TO SUBMIT YOUR CLEARED PRESENTATION/PUBLICATION TO DTIC NOTE: All publications/presentations are required to be placed in the Defense Technical Information Center (DTIC).			
DATE _____			
14. 59 MDW PRIMARY POINT OF CONTACT (Last Name, First Name, M.I., email) Koroscil, Matthew, T matthew.t.koroscil.mil@mail.mil			15. DUTY PHONE/PAGER NUMBER 210-220-8111
16. AUTHORSHIP AND CO-AUTHOR(S) List in the order they will appear in the manuscript.			
LAST NAME, FIRST NAME AND M.I.	GRADE/RANK	SQUADRON/GROUP/OFFICE SYMBOL	INSTITUTION (If not 59 MDW)
a. Primary/Corresponding Author Timothy Hauser	0-4/Maj	88th MDOS/SGOMI	Wright-Patterson AFB
b.			
c.			
d.			
e.			
17. IS A 502 ISG/JAC ETHICS REVIEW REQUIRED (JER DOD 5500.07-R)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
I CERTIFY ANY HUMAN OR ANIMAL RESEARCH RELATED STUDIES WERE APPROVED AND PERFORMED IN STRICT ACCORDANCE WITH 32 CFR 219, AFMAN 40-401 IP, AND 59 MDW 41-108. I HAVE READ THE FINAL VERSION OF THE ATTACHED MATERIAL AND CERTIFY THAT IT IS AN ACCURATE MANUSCRIPT FOR PUBLICATION AND/OR PRESENTATION.			
18. AUTHOR'S PRINTED NAME, RANK, GRADE Matthew Koroscil, Capt, 0-3		19. AUTHOR'S SIGNATURE 	20. DATE 20DEC2016
21. APPROVING AUTHORITY'S PRINTED NAME, RANK, TITLE Edward T. McLeod, Maj, 0-4		22. APPROVING AUTHORITY'S SIGNATURE 	23. DATE 20DEC2016



**PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS****1st ENDORSEMENT (59 MDW/SGVU Use Only)**

<b>TO: Clinical Research Division</b> 59 MDW/CRD Contact 292-7141 for email instructions.		<b>24. DATE RECEIVED</b> 1/11/2017	<b>25. ASSIGNED PROCESSING REQUEST FILE NUMBER</b> 17046
<b>26. DATE REVIEWED</b> 27 Jan 2017		<b>27. DATE FORWARDED TO 502 ISG/JAC</b>	
<b>28. AUTHOR CONTACTED FOR RECOMMENDED OR NECESSARY CHANGES:</b> <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES If yes, give date. <input type="checkbox"/> N/A			
<b>29. COMMENTS</b> <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED  The abstract is approved.			
<b>30. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER</b> Rocky Calcote, PhD, Clinical Research Administrator		<b>31. REVIEWER SIGNATURE</b> CALCOTE.ROCKY.D.1178245844 <small>Digitally signed by CALCOTE.ROCKY.D.1178245844 DN: cn=Rocky, o=U.S. Government, ou=PMO, ou=PMO/SAF, ou=CALCOTE.ROCKY.D.1178245844 Date: 2017.01.27 11:13:33 -0800</small>	<b>32. DATE</b>

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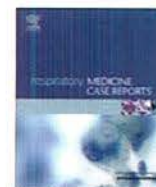
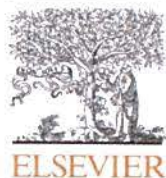
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<b>42. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER</b> Kevin Iinuma, SSgt/E-5, 59 MDW Public Affairs	<b>43. REVIEWER SIGNATURE</b> IINUMA.KEVIN.MITSUGU.1296 227613 <small>Digitally signed by IINUMA.KEVIN.MITSUGU.1296227613 DN: cn=Kevin, o=U.S. Government, ou=PMO, ou=PMO/SAF, ou=IINUMA.KEVIN.MITSUGU.1296227613 Date: 2017.01.30 15:44:54 -0800</small>	<b>44. DATE</b> 30 Jan 2017

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# Acute pulmonary embolism leading to cavitation and large pulmonary abscess: A rare complication of pulmonary infarction



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## ARTICLE INFO

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## ABSTRACT

Pulmonary infarction is an infrequent complication of pulmonary embolism due to the dual blood supply of the lung. Autopsy studies have reported cavitation to occur in only 4–5% of all pulmonary infarctions with an even smaller proportion of these cases becoming secondarily infected. Patients with infected cavitating pulmonary infarction classically present with fever, positive sputum culture, and leukocytosis days to weeks following acute pulmonary embolism. We describe a rare case of acute pulmonary embolism with pulmonary infarction leading to cavitation and subsequent abscess formation requiring left lower lobe resection.

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## 1. Introduction

Acute pulmonary embolism (PE) leads to pulmonary infarction in only 10% of cases because of the dual blood supply of the lungs [1]. Pulmonary infarction causes cavitation in 4–7% of cases [2]. Infarct size larger than 4 cm is a strong risk factor for aseptic necrosis leading to pulmonary cavitation [3]. Infected pulmonary cavitation can lead to pulmonary abscess in a small subset of patients and these patients classically present with fever, leukocytosis, and positive sputum; however it is uncommon to have all 3. We present a rare cause of acute PE leading to cavitation and subsequent pulmonary abscess which required left lower lobe resection.

## 2. Case Presentation

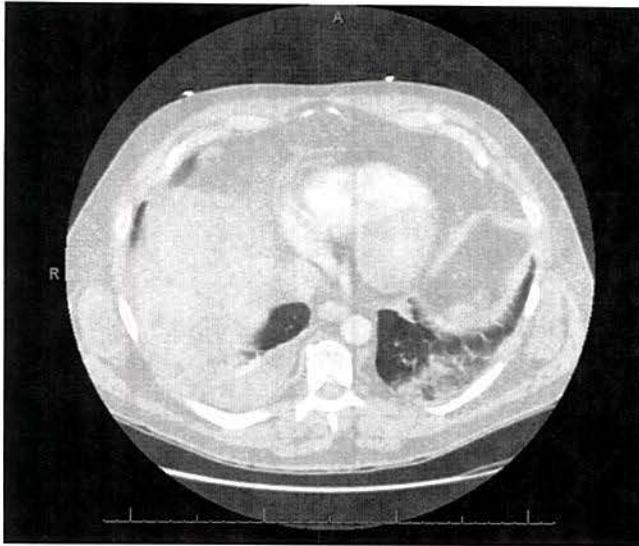
A previously healthy 62-year-old male presented to the emergency department with complaints of chest pain and dyspnea. CT pulmonary angiogram (CTPA) revealed acute pulmonary emboli within the left lower lobe segmental and subsegmental pulmonary arteries. Imaging also showed a left basilar peripheral groundglass and consolidative opacity likely representing

pulmonary infarction (Fig. 1). Intravenous heparin and warfarin therapy were initiated and the patient's hospital course was otherwise unremarkable. Because the patient's venous thromboembolism was unprovoked, he was discharged with a plan for indefinite anticoagulation. The patient returned for a routine outpatient follow-up 3 weeks later with severe cough, generalized malaise, and fatigue. Initial laboratory analysis was unremarkable. A chest radiograph showed interval development of a left lower lobe consolidation with an air-fluid level and pleural effusion (Fig. 2). CTPA demonstrated a large cavitory lesion of the left lower lobe and a loculated pleural fluid collection (Fig. 3). A pulmonary embolus was still evident in the segmental pulmonary artery of the posterior-basilar segment of the left lower lobe. Cardiothoracic surgery was concerned that immediate surgical resection may contaminate the surgical field so intravenous antibiotics and percutaneous drainage of the lung abscess were recommended. The patient was started on intravenous vancomycin and piperacillin/tazobactam and a percutaneous drain was inserted by interventional radiology after 36 hours of antibiotics. The patient clinically decompensated with these treatment modalities, so the patient underwent a left thoracotomy and lysis of adhesions with resection of the left lower lobe.

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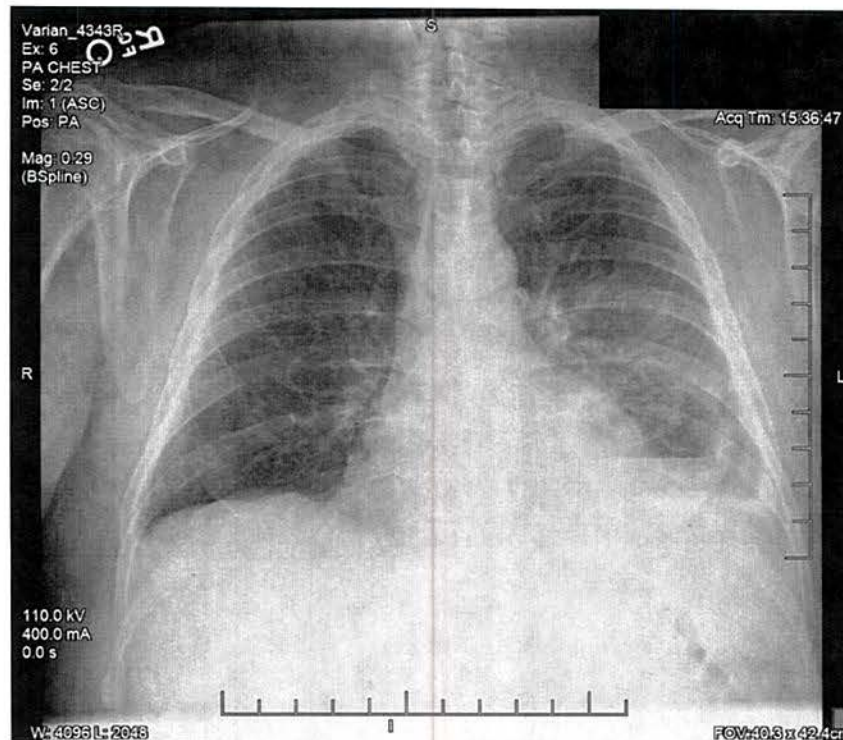




**Fig. 1.** Initial CTPA demonstrating a left basilar peripheral opacity, likely representing pulmonary infarction, as well as a contralateral pleural effusion.

### 3. Discussion

This case radiographically and chronologically highlights the transition of an acute PE with pulmonary infarction to an infected pulmonary cavity with an abscess. This patient's pulmonary infarction size was larger than 4 cm which is a well-known risk factor for pulmonary cavitation. Other risk factors for pulmonary infarction with cavitation include older age, heart failure, and chronic lung disease [2]. Infected pulmonary infarctions lead to cavitation faster than bland infarctions with aseptic necrosis. The mean time to cavitation for an infected pulmonary infarction is 18 days, which is the approximate time interval experienced by our patient [1]. Gram negative organisms are most commonly isolated but positive cultures do not occur in all patients. Our patient was on broad spectrum antibiotics for over 36 hours prior to percutaneous drainage of the left lower lobe abscess which likely affected the culture results. There is a paucity of data on the surgical treatment of infected pulmonary infarction. Some authors have advocated early surgical resection due to of high rates of medical failure which is theorized to be due to the lack of blood supply within the cavity and risk of continued infection [4]. Older case series report high mortality rates for both infected and bland pulmonary cavitation. It is likely that the reported mortality rates are significantly lower in the modern era of



**Fig. 2.** Chest radiograph showing the interval development of a left lower lobe consolidation with an air-fluid level and pleural effusion.

On surgical pathology, the entire left lower lobe was an abscess cavity with copious amounts of purulent material. The procedure was tolerated well and the patient was transitioned to oral antibiotics. Cultures obtained from the percutaneous drain and surgical pathology showed no growth of any organisms.

medicine due to earlier diagnosis and improved therapies for venous thromboembolism. Clinicians should consider infected cavitating pulmonary infarction in patients with recent PE and symptoms of bacterial pneumonia.

The views expressed are those of the authors and do not reflect



**Fig. 3.** Repeat CTPA demonstrating a large cavitary lesion of the left lower lobe with a loculated pleural fluid collection and evidence of a pulmonary embolus in the segmental pulmonary artery of the posterior-basilar segment of the left lower lobe.

the official views or policy of the Department of Defense or its Components.

## References

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- [2] L.S. Libby, T.E. King, F.M. LaForce, M.L. Schwarz, Pulmonary cavitation following pulmonary infarction, *Medicine (Baltimore)* 64 (5) (1985) 342–348.
- [3] A.G. Wilson, A.E. Joseph, R.J. Butland, The Radiology of aseptic cavitation in pulmonary infarction, *Clin. Radiol.* 37 (1986) 327–333.
- [4] Michael D. Butler, Frank H. Biscardi, Denise C. Schain, John E. Humphries, Osbert Blow, William D. Spotnitz, Pulmonary resection for treatment of cavitary pulmonary infarction, *Ann. Thorac. Surg.* 63 (1997) 849–850.

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